DOCUMENT RESUME

ED 079 481 VT 020 375

AUTHOR	Lee, Jasper S.
TITLE	Career Education: Agribusiness and Natural Resources Occupations Cluster.
INSTITUTION	Ohio State Univ., Columbus. Center for Vocational and Technical Education.
SPONS AGENCY	National Inst. of Education (DHEW), Washington, D.C.
REPORT NO	Inf-Ser-87
PUB DATE	73
NOTE	34p.
AVAILABLE FROM	Product Utilization Section, The Center for Vocational and Technical Education, 1960 Kenny Road, Columbus, Ohio 43210 (one of a set, prices available upon request)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Agribusiness; *Career Education; *Employment Opportunities; *Natural Resources; Occupational Clusters; *Occupational Information

ABSTRACT

Intended for teachers, counselors, and administrators, this booklet is designed to provide a brief description of the agribusiness and natural resources occupations cluster. Agribusiness is a blending of agriculture and business and is composed of two groups of occupations known as farm and nonfarm. Agribusiness and natural resources occupations are concerned with meeting the basic needs of man. Occupations in agribusiness and natural resources involve a wide range of subjects and skill requirements in such areas as biological science, economics, communications, business procedures, and transportation. Included in this booklet is a brief description of the opportunities and requirements of occupations belonging to these subgroups of the agribusiness and natural resources cluster: (1) agricultural production, (2) agricultural supplies and services, (3) agricultural mechanics, (4) agricultural products, (5) ornamental horticulture, (6) forestry, and (7) natural resources. In addition to the brief descriptions, a review of the changes occurring in agriculture, the importance of agribusiness and natural resources occupations, and employment trends are discussed. (SB)

ED 079481

Information Series
No. 87
VT 020 375

CAREER EDUCATION: AGRIBUSINESS AND NATURAL RESOURCES OCCUPATIONAL CLUSTER

ERIC

CLEARINGHOUSE ON VOCATIONAL
AND TECHNICAL EDUCATION

FILMED FROM BEST AVAILABLE COPY

ACKNOWLEDGEMENTS

The profession is indebted to Jasper S. Lee for his scholarship in the preparation of this report. Recognition is also due Gary Beasley, Mississippi Curriculum Coordinating Unit for Vocational-Technical Education; and Roger D. Roediger, The Ohio State University; for their criticial review of the manuscript prior to final revision and publication. Development of the publication was provided by Paul E. Schroeder, and Alice J. Brown provided the technical editing.

Robert E. Taylor
Director
ERIC Clearinghouse on Vocational
and Technical Education

The material in this publication was prepared pursuant to a contract with the National Institute of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official National Institute of Education position or policy.

ED 079481

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Information Series No. 87
VT 020 375

CAREER EDUCATION:

AGRIBUSINESS AND NATURAL RESOURCES OCCUPATIONS CLUSTER

Jasper S. Lee
Associate Professor of Agricultural Education
Mississippi State University

ERIC Clearinghouse on Vocational and Technical Education
The Center for Vocational and Technical Education
The Ohio State University
1960 Kenny Road Columbus, Ohio 43210

1973

CONTENTS

Introduction 1
Meaning of Agribusiness and Natural Resources 1
Changes in Agriculture 3
Occupational Importance of Agribusiness and Natural Resources 4
Job Opportunities in Agribusiness and Natural Resources 6
Trends in Employment Opportunities 20
Education Relating to Agribusiness and Natural Resources Occupations 22
Summary 24
Bibliography 26

INTRODUCTION

The U. S. Office of Education (1971) has identified 15 clusters, or areas, of occupations (see Figure 1). Each cluster is composed of occupations which are related in some way. One of the clusters is agribusiness and natural resources, the subject of this publication. If instruction about careers in agribusiness and natural resources is to be integrated into learning activities in the schools, educators must have some understanding of the cluster.

This publication is intended for an audience of general educators, including teachers, administrators, and counselors. The purpose is to provide a brief description of the agribusiness and natural resources occupations cluster. Several examples of occupations are given and briefly described. Because of the large number of occupations in the cluster, it is impossible to list all of them. Listing a few occupations tends to be dangerous in that the selection process may not result in a representative sample being given. A more complete listing and description of these occupations can be found in several of the references listed in the bibliography (see Hoover, Norman K., Handbook of Agricultural Occupations: Preparation for Technical and Professional Work in Agriculture; Roy, Ewell Paul, Exploring Agribusiness; and Stone, Archie A., Careers in Agribusiness and Industry).

MEANING OF AGRIBUSINESS AND NATURAL RESOURCES

Agribusiness is a blending of agriculture and business (American Vocational Association, n.d.). It is composed of two groups of occupations, known as farm and nonfarm. These are intimately related, and it is often difficult to tell where farm work ends and nonfarm work begins. Farm work primarily concerns itself with culturing plants and animals, which involves the management of many natural resources, especially soil and water. Nonfarm agricultural work requires much of the same knowledge and many of the same skills as farm work, in addition to specialized business and technical skills.

Agribusiness and natural resources occupations are concerned with meeting the basic needs of man. Food, clothing, and shelter are items of need with which all persons come into daily contact. Their raw product forms are commonly associated with agriculture. In recent years the more appropriate and inclusive term of agribusiness has come

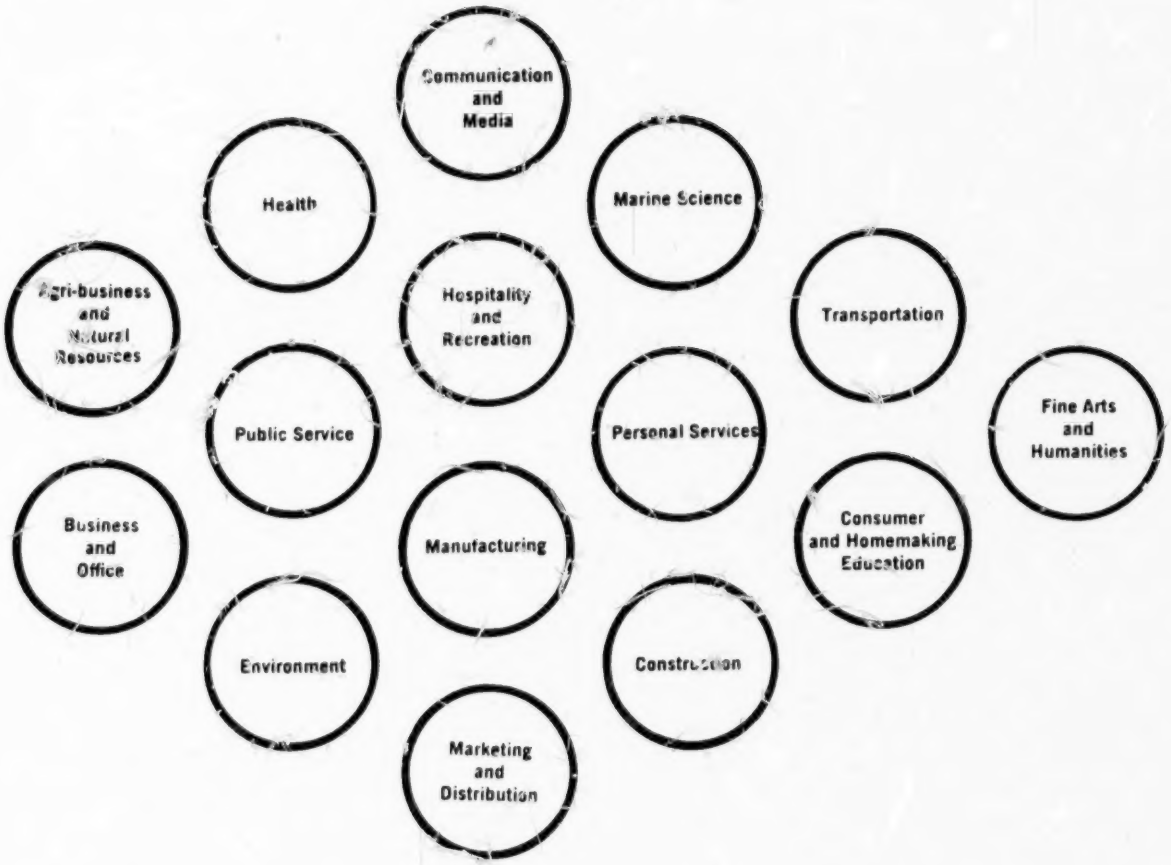

Fig. 1 --The Fifteen Occupational Clusters (U.S. Office of Education, 1971)

into use. Agribusiness and natural resources occupations are not limited to just on-farm work involved in producing food and fiber. These occupations are also concerned with making available the inputs (supplies, services, and machinery) required for modern farming. Such inputs include, among other things, fertilizer, seed, chemicals, and power and machinery. Once produced, food and fiber are processed, inspected, and marketed--all as a part of agribusiness.

Occupations in agribusiness and natural resources also include forestry, ornamental horticulture, and aspects of natural resources which are said to be renewable. These areas tend to involve some of the same knowledge and skills as the traditional areas of agriculture and have expanded considerably in recent years. The relationship of agribusiness to natural resources becomes especially significant when the production of plants and animals is recognized as the planned utilization of natural resources--some even say controlled pollution! (Controlled pollution occurs when chemicals, equipment, and other cultural practices which have the potential to cause pollution are used at rates which do not cause any appreciable pollution problems. For example, chemicals are used to control certain insects. An exact level of usage is required in order to be effective; i.e., the environment of the insect must be sufficiently "polluted" with the chemical so that death of the insect results and so that other, more desirable life is not affected.)

Agribusiness and natural resources occupations involve the utilization of natural resources to produce plants and animals and their products, plus provide needed supplies and services for production and getting the items that are produced to the consumer in desirable form. Many occupations requiring a wide diversity of skills are included. A few of the broad areas in which skills are needed are biological science, chemistry, economics, communications, mechanics, physical science, business procedures, and transportation. Workers are often required to have an understanding of how these areas relate to each other and to the environment. In effect, some overlap of agribusiness and natural resources with the other occupational clusters may occur.

CHANGES IN AGRICULTURE

In its early history, the United States was a rural society. Farming was the way of life. Practically everything a family needed was produced at home with very little need for purchasing goods except

for salt, coffee, and a few other essential items. Agricultural education and agricultural research have received high priority from the beginning of the country, especially since the latter part of the 1800's. As new practices were perfected, the efficiency of farming increased. Specialization in both agriculture and industry occurred. Industrialization created a demand for workers in nonfarm jobs. One farm worker became able to produce the food and fiber required by more and more people. Thus, workers were released from farming to work in industry to produce goods, such as automobiles, radios, and other luxuries, many of which are taken for granted today. Currently, one farm worker in the United States produces enough food and fiber to meet the needs of approximately 50 people (U.S. Bureau of the Census, 1972).

Just as technological advances have released workers from the farms, new jobs have been created to supply the inputs needed in agriculture. As chemicals were perfected, workers were needed to manufacture, distribute, and sell them to farmers. The development of new equipment required trained mechanics. Consumer preferences for products that were easy and ready to use resulted in increased jobs for persons involved in marketing, inspecting, and processing agricultural products. These advances have all been made possible by the supportive work of researchers, scientists, and educators in agribusiness and natural resources. Today, agriculture requires persons who are well-educated and desire employment in scientific, business, or mechanical areas.

The cluster of agribusiness and natural resources is an important factor in the economy of the United States. The cash receipts of the farms have increased in recent years and amounted to more than $56 billion in 1971 (U.S. Department of Agriculture, 1972). To obtain this level of production, farmers spent $43 billion for goods and services to produce crops and livestock (Office of Information, 1972). This sum includes amounts for the purchase of farm tractors and equipment, feed and seed, chemicals, fuel and lubricants, fertilizer, and other supplies.

OCCUPATIONAL IMPORTANCE OF AGRIBUSINESS AND NATURAL RESOURCES

Just as the agribusiness and natural resources cluster accounts for a considerable volume of economic wealth, it also accounts for a large number of occupations. It is difficult to obtain information on

the exact number of persons employed in this occupational cluster. This is because of the diversity of the occupations and the fact that tabulations of the number in certain areas have not been made. For example, workers in agricultural supplies and products are often classified as in manufacturing and their affiliation with agribusiness is relatively unnoticed. Efforts are currently under way to compile census data so that more precise information will be available concerning the volume of employment in agribusiness occupations. It has been said that approximately 40 percent of the total work force in the United States deals with or handles agricultural supplies, services, or products. Many of these (20 to 25 percent of the total) require a knowledge of plant and animal science and, sometimes, practical farm experience (Weyant, 1965). Other sources indicate that 20 percent of all jobs in private employment are related to agriculture (Office of Information, 1972). In the latter case, this number would include all agribusiness workers in non-government jobs but would not include all of those involved in all aspects of natural resources and ornamental horticulture.

In terms of the number of persons employed in agribusiness and natural resources occupations in the United States, the following estimates of a few areas are given.

TABLE 1

Persons Employed in Agribusiness and Natural Resources

	Estimated Number of Workers in the United States*
Agricultural Production	4,293,000
Agricultural Products	
Processing	3,000,000
Wholesaling	1,000,000
Retailing	3,000,000
Agricultural Supplies	2,000,000
Forestry (All Timber Based Employment)	3,800,000
Agricultural Research and Education	125,000

*Sources: Mississippi State University, 1972; U.S. Department of Agriculture, 1972; and U.S. Bureau of the Census, 1972.

JOB OPPORTUNITIES IN AGRIBUSINESS AND NATURAL RESOURCES

Opportunities for employment in agribusiness and natural resources occupations are found at all levels, ranging from the unskilled to the skilled and including technical, managerial, and professional. The level at which one is employed relates to the amount of education, skill, and past work experiences. In many occupations, the latter is very important. Work experience is a valuable teacher and provides an opportunity for employers to discover the capabilities of workers. For self-employed workers and managers, experience provides a backlog of information on which to base decisions and direct future work activities.

Earnings and fringe benefits tend to vary with training and experience, but may be related to degree of responsibility and the ability to perform satisfactorily on a job. Earnings are often related to the size of an agribusiness or the presence of unions, but not always. Fringe benefits, as found in modern industrial or manufacturing jobs, are also found in agribusiness. However, for self-employed workers and those with low levels of skill, the fringe benefits may vary considerably. In some cases, the fringe benefits in agribusiness are less sophisticated but may be more meaningful to workers. For example, workers on farms are often furnished free housing and associated benefits.

Occupations in the agribusiness and natural resources cluster involve a wide range of subjects and skill requirements. Since it is impossible to treat each occupation individually, these occupations are often placed in groups, or subclusters. The groups commonly used include agricultural production (farming), agricultural supplies and services, agricultural mechanics, agricultural products, ornamental horticulture, forestry, and natural (agricultural) resources (U.S. Office of Education, 1969). Each group contains many different levels of work and represents, to some extent, areas of similar knowledge and skill. A broad description of the opportunities and requirements of the occupations in each of these groups follows.

Agricultural Production

Occupations in agricultural production involve the production of plants and animals. This type of work is not as simple as it may appear on the surface. If today's farm worker is to advance beyond the level of an unskilled laborer on farms producing plants or animals or

both, he must be competent in the use of land, water, facilities, chemicals, machinery, and finances as well as the management of labor. Machinery is found on all farms. Thus, mechanical skills are essential, especially as related to the sophisticated equipment that may be used on specialized farms. In fact, many workers in agricultural production spend most of their time operating and maintaining equipment. To be a good equipment operator requires knowledge beyond the mechanics of operating the equipment. An understanding of soils, plants, and chemicals is required.

Persons working in agricultural production may be self-employed or hired workers. Self-employed workers have their own farms and may hire other workers to help them. Most persons view the farm worker as a self-employed owner or renter. This image, however, is far from accurate. Farms are getting larger, and, as they do, many workers are hired. Thus, persons have increasing opportunities to find good employment on farms without having to obtain the large amount of financial investment required to own and operate a farm.

Hired farm workers are found in all occupational levels, ranging from unskilled to professional. The latter is found on large farms which have need for the full-time service of professional workers, such as agronomists or veterinarians. Also, there are a number of jobs which require considerable knowledge of farming but which do not directly involve farm work. These are usually concerned with providing assistance to farm workers. For example, a vegetable processing plant may have a field man who provides assistance to all farmers growing vegetables for processing by the plant. This type of work requires a thorough knowledge of agricultural production as related to a particular crop.

A knowledge of plant science is important in many agricultural production occupations. Some of these occupations permit workers to specialize in one particular plant or crop. Others may be diversified, meaning that workers must be knowledgeable about several different crops. Several examples of occupations requiring a knowledge of plant science are listed here.

Agronomist - studies the production of field crops. The work may involve conducting research to develop new varieties of crops, techniques of culture, and control of pests. Agronomists often specialize in a particular area, such as soils or a certain crop. Considerable education is required, often at the doctoral level.

Farm manager - manages a farm, often for the owner. The duties include planning farming activities; securing labor, machinery, seed, fertilizer, and other inputs; directing the work of growing and harvesting crops; and keeping the necessary records. Formal education requirements vary, but vocational, technical, and college courses in agriculture are very helpful. Practical experience is important. Farm managers usually begin in other jobs on the farm and advance to the job of farm manager.

Crop farmer - grows crops, such as corn, cotton, and vegetables. High levels of skill in mechanics, chemicals, management, and other subjects are often needed. Education needs vary, but successful farmers must be continually involved in keeping their knowledge and skills up-to-date. Business and management skills are essential.

Crop farm worker - works on a farm that produces crops. Such workers are usually hired and paid on the basis of experience and skill. Education and skill requirements vary with the type of work performed. Laborers need little training, whereas equipment operators need considerable skill.

Custom farm operator - does various farm work. A custom farm operator usually owns equipment that is used in producing or harvesting crops. He is paid by farmers to perform certain duties. A high level of mechanical skills is required. In addition, he must understand farming operations.

Entomologist - studies insects, especially as related to plant and animal life. The work may involve controlling or growing certain insects, as well as the identification and classification of all insects. Most entomologists hold college degrees, many at the doctoral level.

Research technician - assists agronomists and others in conducting experimental projects. The work may be in a laboratory or at a field test plot. Such workers must have at least a high school education and often more.

(Occupations in forestry and ornamental horticulture which involve plant science are listed separately.)

Animal science is an important area of work that is concerned with raising animals and obtaining their products. A few examples of animal science occupations are listed below:

Animal scientist - studies various aspects of animal selection, breeding, feeding, management, and other areas. The work often involves conducting scientific research projects designed to contribute to improved systems of production. Considerable education may be required, often at the doctoral level. Practical experience is helpful. Most opportunities are with colleges and universities, experiment stations, and private research organizations.

Dairy farm worker - works on a dairy farm. The work may involve feeding and milking cows, cleaning dairy barns, maintaining fences, operating equipment, and the like. Education requirements vary with the type and size of farm. Experience is beneficial.

Fish farmer - raises fish. This may involve feeding, harvesting, and hauling fish for food or hatching eggs and raising young fish for use in stocking on food fish farms. A fish farmer needs considerable knowledge of fishery biology. Experience in working on a fish farm is very important.

Herdsman - maintains animals on a hog, beef cattle, dairy cattle, or other farm. The work may involve feeding and caring for animals, making minor equipment repairs, buying livestock, and maintaining facilities. Education and training vary, but experience is very beneficial. Some herdsmen have college degrees.

Horse trainer - trains horses for riding, racing, or other purposes. The work may also involve grooming, feeding, and caring for horses in other ways. Experience is very important and can often be gained by assisting a horse trainer.

Laboratory animal producer - raises animals, such as monkeys and mice, for use in laboratory experiments. Education and training requirements vary, but often include job experience and the completion of a special training program.

Livestock rancher (farmer) - raises livestock. Many specialize with one type, such as beef cattle, but many also have a combination including sheep, hogs, beef cattle, and other animals. Education and training vary, depending on the size and type of farm.

Agricultural Supplies and Services

The production of food and fiber requires many consumable inputs in terms of supplies and services. Agricultural supplies and services occupations are concerned with making these inputs available to farmers. Such occupations are concerned with agricultural chemicals, feeds, seeds, fertilizers, and services associated with the utilization and application of these supplies. Persons in these occupations do not work in isolation from those in agricultural production. Workers in agricultural supplies and services occupations must understand farm problems and keep up-to-date on the latest recommendations and cultural practices.

Education, along with practical experience, is important in these occupations. Most often, persons with farm backgrounds are preferred for these jobs, especially if the work involves contact with farmers.

A wide range in levels of work is found in these occupations. A common practice is for one to begin in a lower level job and advance as experience, capability, and opportunity permit. Of course, persons without certain basic education cannot usually expect to advance. Several examples of agricultural supplies and services occupations are listed below:

Agricultural supplies salesman - sells various chemicals, seed, feed, and other items needed by farmers and ranchers, homeowners, and related businesses. Such work requires a knowledge of the products sold and agricultural problems. Experience in farm work, along with a knowledge of merchandising procedures, is beneficial.

Agricultural supply store manager - manages wholesale and/or retail store which specializes in agricultural supplies, such as fertilizer, seed, feed, and chemicals. Duties may involve hiring and supervising workers, purchasing stock, coordinating sales activities, approving advertising and displays, and other activities. Practical experience is very beneficial. In fact, such managers usually begin in lesser positions and advance to manager. Educational requirements vary, but may include a study of agribusiness on the secondary and post-secondary levels. A college degree may be required.

Agricultural supplies truck driver - drives truck delivering agricultural supplies. Little formal education is required; however, the ability to read and write is essential. An operator's license is usually required.

Agricultural supplies warehouse worker - performs routine work in maintaining stocks of supplies in warehouses. This may involve lifting sacks, loading trucks, and other activities. Little formal education is required.

Custom applicator - applies chemicals, fertilizers, etc., to farm crops. Custom applicators are usually employed by dealers or manufacturers of agricultural supplies or may be self-employed. Airplanes, trucks or other equipment is used. On-the-job training is important. A high school education, including instruction in agriculture, is essential. Aerial applicators must receive special pilot training.

Feed mill worker - works in feed manufacturing mill. The work may involve using sophisticated machinery, lifting sacks of feed, and the like. Little formal education is required beyond high school. On-the-job training is important.

Veterinarian - diagnoses and treats diseases and disorders in animals. The work may involve performing examinations, giving shots, conducting laboratory tests, performing surgery, conducting autopsies, clipping hair from animals, and the like. Education requirements include a doctor of veterinary medicine degree.

Veterinary assistant - assists veterinarians. The work may involve feeding animals, holding animals for examinations, sterilizing surgical instruments, washing animals, and the like. Educational requirements often involve a technical level program conducted especially for veterinary assistants.

(Occupations such as agriculture teacher and county agent and various government jobs in agriculture are often also included as services.)

Agricultural Mechanics

Advances in agriculture have occurred simultaneously with the increased use of machinery. Nearly all areas of modern agriculture

involve sophisticated power equipment. The operation and maintenance of such equipment require persons who are skillful and knowledgeable. In addition, agricultural mechanics includes occupations involving the construction and maintenance of all types of agricultural buildings and facilities. Occupations concerned with the structures and practices used in soil and water management are also often considered a part of agricultural mechanics.

A wide range in levels of agricultural mechanics work is found. These levels range from the low-skilled mechanic's helper to the professional level of an agricultural engineer. Operators of equipment need considerable practical experience in equipment operation and maintenance. Mechanics need indepth skills in the repair and adjustment of equipment. In fact, the amount of skill required is often greater than that of an automobile mechanic. The kinds of equipment used and skills needed tend to vary with the agricultural production enterprises that exist in a particular area. For example, in the midwest, the equipment that is used centers primarily around the production, marketing, and processing of corn, wheat, and soybeans. Therefore, workers in mechanics in this area need skills in the specialized equipment required with these crops. Several examples of agricultural mechanics occupations are listed below:

Agricultural engineer - studies various aspects of agriculture as related to engineering knowledge and technology. Develops new designs for agricultural machinery and facilities, studies soil and water problems, analyzes power requirements and the like. A college degree is required. Many have master's or doctor's degrees.

Agricultural machinery mechanic - repairs agricultural machinery. The work involves repairing, assembling, and testing all types of agricultural machinery, including the overhauling of engines. Many specialize in the particular line of machinery sold by their employers. A high school education is essential. Many take special vocational courses and work as mechanics' helpers.

Agricultural machinery mechanic's helper - assists an agricultural machinery mechanic. High school and vocational training are beneficial.

Agricultural machinery operator - operates agricultural machinery, such as cotton pickers and disc harrows. The work also involves performing simple maintenance activities on the machinery. Practical experience is beneficial.

Agricultural machinery salesman - sells agricultural machinery. This involves giving on-farm demonstrations, making simple adjustments, appraising used machinery, and preparing price quotations and contracts. A high school education is essential, along with practical on-farm experience.

Agricultural machinery setup man - assembles new machinery. Most agricultural machinery is shipped to dealers before it is fully assembled. A setup man completes the assembly process and prepares the machinery for field operation. A high school education is essential, as is vocational or on-the-job training. Reading and interpreting instructions are essential parts of the work.

Agricultural Products

Occupations in agricultural products are concerned with marketing, inspecting, and processing the food and nonfood products that are produced on farms. These occupations are essential in making available to consumers the kinds and forms of goods desired. The provision of wholesome foods that have been conveniently prepared and packaged, possibly even precooked, and desirable nonfood products is the primary concern of agricultural products work.

These occupations are sometimes erroneously thought to involve nonagricultural work. However, the agribusiness concept embraces, among others, those occupations requiring knowledge and skill in agricultural subjects that are concerned with getting agricultural products into desirable forms for consumption. Agricultural food products include meat, fish, poultry, eggs, milk and dairy products, fruits and vegetables, cereal grains, and other foods and beverages. The common nonfood products include cotton, wool, and tobacco.

The range in the level of work in agricultural products occupations is wide, just as in other areas of agribusiness. Work in agricultural products ranges from the cleaning and maintenance of processing plants to the actual operation of food processing machinery. The work also ranges from the management of plants to the professional level which includes research, teaching, and product development. Nonfood products also have a similar range. The level of employment depends on education, experience, and capability. Managers are often experienced persons who have proven themselves as productive workers.

A few examples of occupations in agricultural products are listed below:

Food

Dairy plant worker - works in a plant which processes milk. A variety of tasks may be performed. A high school education is usually required for advancement.

Food technologist - studies and plans methods of food processing. The work is often concerned with developing new forms of food products. Many have college degrees, some master's or doctor's degrees.

Grain sampler - obtains samples of grain for grading and inspection. A high school education is essential. A grain sampler must be familiar with laws and regulations on grain sampling.

Laboratory technician - runs quality tests on food. Quality control is important in food processing. The work of the laboratory technician is to make various taste, color and quality tests along with making bacterial counts. A high school education is adequate if supplemented with on-the-job experience. Some have taken studies beyond high school, such as community or senior colleges offer.

Livestock buyer - buys livestock for feed lots, slaughter houses, or individuals, often on a commission or salary basis. Considerable experience is often required in order to be able to judge livestock and buy according to orders. Some buyers have college degrees in animal science.

Meat cutter - cuts and trims meat. Work is often found in supermarkets, large restaurants, and meat packing plants. Meat cutters use various knives, saws, and grinders. The work may also involve packaging and weighing meat. On-the-job training is often required; sometimes apprenticeship training programs are followed. Some vocational schools offer courses in meat cutting. (Meat cutter is distinguished from butcher in that a butcher normally works in a slaughter plant and performs tasks related to the slaughtering of animals.)

Milk bulk-tank truck driver - drives a truck which transports milk in large tanks. This often involves driving from farm to farm collecting milk and hauling it to a processing plant. The work sometimes involves taking samples of milk and testing for quality. A high school education is beneficial.

Poultry inspector - inspects live or dressed poultry for wholesomeness. Most poultry inspectors work around slaughter plants and observe birds for quality and the presence of disease. Some special training is required but may be provided through on-the-job experience.

Produce buyer - purchases farm produce for resale to wholesalers or retailers or for a chain of supermarkets. A high school education plus vocational training and on-the-job experience are usually necessary.

Nonfood

Cotton classer - determines the grade and other quality conditions of cotton. Considerable experience may be necessary in order to use the U. S. Department of Agriculture standards for classifying cotton.

Gin operator - operates a cotton gin. A knowledge of certain fundamentals of mechanics, including welding and other areas, is essential. Practical experience as a gin worker is necessary.

Seed analyst - checks the quality of seed. The work involves running germination tests and determining purity of seed. The work is usually with a seed company or certification agency. A high school education is essential, along with instruction in agriculture. Some analysts have taken college work.

Tobacco grader - grades tobacco by observing, feeling and smelling the leaves. Size, color and other factors are important. Considerable on-the-job experience may be necessary.

Ornamental Horticulture

Occupations in ornamental horticulture involve the culture

of plants for ornamental or aesthetic purposes. Sometimes the work also involves the arrangement of nonplant materials, such as rocks and statuary, to achieve desired effects.

Several occupational areas are found in ornamental horticulture. These may include greenhouse and nursery operation and management, landscape design and establishment, turf management, arboriculture, floriculture and other areas. Some of these occupations are familiar to the lay public. Others, such as arboriculture and floriculture, are not. Arboriculture is concerned with the growth of trees and shrubs for ornamental purposes. Floriculture is concerned with the growth of ornamental and flowering plants. Many of these occupations relate to the establishment and maintenance of a pleasing environment.

The level at which one works in ornamental horticulture occupations is related to education and experience. Persons with low levels of education and experience often perform jobs such as digging shrubs, mowing turf areas, or loading horticultural products. Workers with some education and experience may be managers, retail sales clerks, or floral arrangers. Workers with considerable education and experience may be landscape architects, researchers, or teachers.

A few occupations in ornamental horticulture are listed below:

Floral designer - designs flower arrangements. The work may involve selecting flowers; fastening flowers with tape, pins, etc.; planning floral arrangements; and painting wreaths.

Florist - sells flowers. Some florists may also grow flowers and prepare flower arrangements. A high school education is very helpful. Skills in flower arrangement are gained through on-the-job training or enrollment in courses offered by vocational schools or colleges.

Greenhouse manager - oversees the operation of a greenhouse business. This may involve supervising workers, buying supplies and selling products, taking inventory, and conducting advertising programs. Some have college degrees, but a high school education with on-the-job experience may be adequate.

Horticulturist - studies horticultural crops, such as vegetables or flowers. The work is often done with experiment stations or large commercial growers and involves developing improved varieties or techniques of culture. A college degree is required. Many horticulturists have master's or doctor's degrees.

Landscape gardener - establishes and maintains flowers, shrubs, lawns, and other areas around buildings, in parks, and the like. A high school education and work experience with a landscaper are beneficial. Instruction in horticulture or agriculture is very helpful.

Nursery worker - grows ornamental shrubs and trees for replanting. Instruction in agriculture is beneficial. The work is usually under the supervision of a foreman or nursery manager.

Tree pruner - prunes fruit and flowering trees to encourage better production or secure desired forms; prunes trees that interfere with power lines, streets, and the like. Most skills are learned by working alongside an experienced tree pruner.

Forestry

Occupations in forestry are concerned with producing, managing, harvesting and utilizing trees and their products. Many of the everyday items with which we come into contact, including the daily newspaper, are derived from wood. In fact, more than 10,000 items are manufactured in one form or another from wood (Thames, 1972). The efficient production of these items requires many workers who are highly skilled and competent in their work. The technology surrounding the work in forestry has increased, just as in other areas of agribusiness and natural resources.

Forestry work varies considerably in nature. Some jobs involve the planting and culture of trees; others involve harvesting trees and tree products. After harvesting, considerable work may be required to manufacture the desired products. Some forestry jobs involve related areas concerned with wildlife, environment, soil and water conservation, and recreational aspects of forestry and may be included in the natural resources group.

Forestry work involves a wide range in level of experience and skill requirements. Many of these occupations involve the operation of power machinery, ranging from chain saws, tractors and trucks to milling equipment. Timber cruisers and buyers must have considerable skill in estimating the volume and value of uncut trees. Professional foresters must have high levels of education and considerable work experience to perform their teaching and research activities. Workers involved in

protecting forests, such as forestry fire fighters, must understand the nature of fire and fire fighting and be willing to take risks that could result in physical injury. Logging and lumber mill workers need skills in the operation of equipment to maximize the returns from timber.

A few of the occupations in forestry are listed below:

Forester - performs a variety of work associated with forest management and development. The work may involve planning cutting programs, studying improved methods of forestry production, investigating diseases of trees, improving tree varieties, and many other areas. A college degree is usually required. Specialized areas of work may require a master's or doctor's degree.

Grader and inspector - inspects, grades and sorts lumber. A high school education is essential in most cases. On-the-job training and attending related short courses are beneficial.

Logger - involves a variety of work related to harvesting and hauling trees. The work is rugged and involves using equipment that may be somewhat hazardous. No particular educational requirements exist, but a knowledge of mechanics is beneficial.

Sawmill worker - performs a variety of routine work around a sawmill. Considerable work experience may be required to move into advanced positions, such as using power equipment to saw logs into desired lumber sizes. Little formal education is required.

Timber cruiser - specializes in the measurement of trees. Such measurement is used as a basis for estimating the volume of timber in a given acreage. The work may also involve marking the trees that are to be cut and supervising other workers involved in making a cruise. A high school education is beneficial; especially useful is a good foundation in mathematics; experience assisting in timber cruising is most important.

Tree nursery worker - assists in the operation of a tree nursery. The kind of work varies with education and experience. It may involve planting seed, pulling seedlings, testing seed, preparing soil, and the like.

Natural Resources

The work in natural resources occupations involves maintaining and improving various aspects of the environment, especially those aspects related to the renewable natural resources and agricultural productivity. These occupations are often concerned with wildlife, fish, forestry, water, soil, air, recreation, and other areas. The relationship of natural resources work to the preservation of the environment is very close. Without such work, certain wild animals and fish might become extinct, and the water and air might become unfit for use. Many of these occupations also involve utilizing certain natural resources for recreational purposes.

Most of the positions in renewable natural resources occupations involve working outdoors. The level of work ranges from occupations requiring very little skill or experience to those requiring considerable skill and experience. Professional level workers are usually assisted by technicians or helpers. Most of the work is with governmental agencies, but there are other opportunities for employment. As emphasis on maintaining a favorable environment increases, the demand for workers with skill and experience in areas of natural resources is likely to increase.

Several examples of occupations in renewable natural resources are listed below:

Camp manager - manages camping areas. The work includes collecting fees from campers, maintaining and constructing facilities, cleaning camp grounds, mowing grass, and the like. A camp manager may have several persons working under his supervision. Educational requirements vary, but a high school education and vocational training are very useful.

Fish hatchery worker - works in a fish hatchery under the supervision of a fish biologist. The work involves collecting spawns, tending eggs, caring for fish, cleaning fish tanks, and the like. No special education is usually required; however, courses in agriculture and biology are helpful.

Game warden - enforces laws relating to wild game and fish. The work involves patrolling wooded areas, checking hunter's licenses, tagging game, selling permits, arresting violators of game laws, noting the condition of wildlife, and the like. A high school education is usually required, along with thorough knowledge of game and fish laws.

Park technician - plans and constructs parks. This involves building trails, picnic areas, sites for camping, and the like. Often a park technician has several people working under his supervision. Educational and experience requirements vary.

Soil conservationist - studies the use and conservation of soil and related resources. The work involves developing conservation plans, assisting in the implementation of such plans, and providing other assistance. Most soil conservationists are employed by the U. S. Department of Agriculture. A college degree with a major in agronomy or related area is required.

Wildlife aide - assists foresters, biologists, and other persons with wildlife programs. The work may involve cutting and planting trees or other vegetation, counting wildlife numbers, constructing trails, feeding wildlife, and related activities. A high school education is almost essential, especially instruction in agriculture.

Wildlife biologist - studies wildlife. The work may vary but a wildlife biologist often specializes in one specific area, such as fish or water fowl. Activities often involve studying the habits of wildlife, developing ways of protecting endangered species, conducting research into wildlife problems, and the like. A college degree is usually required; sometimes master's or doctor's degrees are required.

TRENDS IN EMPLOYMENT OPPORTUNITIES

Statistical reports often do not show the true trends in employment in agribusiness and natural resources occupations. Such reports tend to place many of these occupations in manufacturing, which includes agricultural supplies and products; construction, which includes agricultural construction; and other areas, which in actuality involve agribusiness skills. The demand for well-trained workers is good and is likely to remain so, especially as the needs for food, clothing, and shelter continue to increase.

A study conducted by Rutgers University (Drawbaugh and Merritt, 1972) determined that between 1971 and 1976 considerable increases in

full-time employment should occur in certain agribusiness and natural resources occupations. Some of the occupational areas in which to expect the greatest increases are: horticultural businesses and services (28.4 percent increase), natural resources and governmental services (29.3 percent increase), farm production and related services (12.2 percent increase), agricultural machinery (42.3 percent increase), animal health and care services (31.1 percent increase), food processing (24.3 percent increase), and food distribution (55.0 percent increase). The study also determined the specific job titles in each of these areas showing the greatest increases. Some of these job titles and the percent of increase in full-time employment between 1971 and 1976 are as follows:

Horticultural businesses and services: agricultural equipment operator (42.3), chemical sprayer (67.0), groundskeeper (46.2), landscape architect (69.8), landscape gardener (46.5), lawn technician (84.0), nursery sales worker (50.0), nurseryman (142.9), packer/shipper (66.7), skilled landscape worker (86.0), tree surgeon helper (81.3), and warehouseman (51.9).

Natural resources and governmental services: campground manager (100.0), environmental engineering aide (50.0), environmental field worker (66.7), gardener (400.0), agricultural inspector (268.7), and water resources engineer (30.4).

Farm production and related services: animal caretaker (150.6), herdsman (25.3), orchardist (16.9), and livestock farmer (16.9).

Agricultural machinery: farm machinery setup (157.2), farm mechanic (80.0), diesel mechanic (110.8), parts sales clerk (21.9), salesman (64.0), truck driver (144.4), and weeder (55.6)

Animal health and care services: animal caretaker (33.8), kennel man (24.7), veterinary laboratory technician (45.5), veterinary nurse (58.1), and sales clerk (38.9).

Food processing: butcher (28.0), laboratory technician (64.4), preparation and canning supervisor (44.4), pressman (58.3), quality control technician (48.1), and unskilled laborer (30.4).

Food distribution: delivery manager (63.9), retail manager (71.8), meat clerk (193.7), meat cutter (75.9), meat wrapper (100.0), produce clerk (156.9), route driver (76.2), and food products salesman (20.9).

The opportunities for part-time work will decline for many occupations. A part-time job is often seasonal and is one which requires less than the equivalent of 150 full-time days each year. Most employers are expanding to full-time jobs in order to insure a supply of dependable labor when it is needed.

EDUCATION RELATING TO AGRIBUSINESS AND NATURAL RESOURCES OCCUPATIONS

Since the level of competency required for success in agribusiness and natural resources occupations has increased in recent years, persons planning to enter such occupations must be well-trained. Also, such persons should be provided with sufficient information and experiences so that a wise choice of occupations can be made. Much of the education and training is provided by the public schools, including local community colleges and area vocational schools, as depicted in Figure 2.

Instruction in agribusiness and natural resources and related areas often begins in the elementary school. Such instruction is designed to develop in children an awareness of the importance of agribusiness and natural resources and to acquaint them with the various occupations that exist. Many schools use arithmetic, science, art, and other common elementary grade studies as vehicles for teaching about agribusiness and natural resources.

In the middle or junior high school, boys and girls are given the opportunity to explore various aspects of agribusiness and natural resources. The first exploration is in rather broad areas, but as interests begin to develop in certain specific areas, opportunity is provided for indepth exploration. Exploration must be accomplished through as many realistic, hands-on activities as possible. Some of these activities may include the utilization of school land-laboratory facilities; field trips to farms and agribusinesses; activities conducted in the classroom relating to plants, animals or soil; inviting resource persons to the school; and many other ways.

Preparation for entering agribusiness and natural resources occupations may begin in high school and continue into community college,

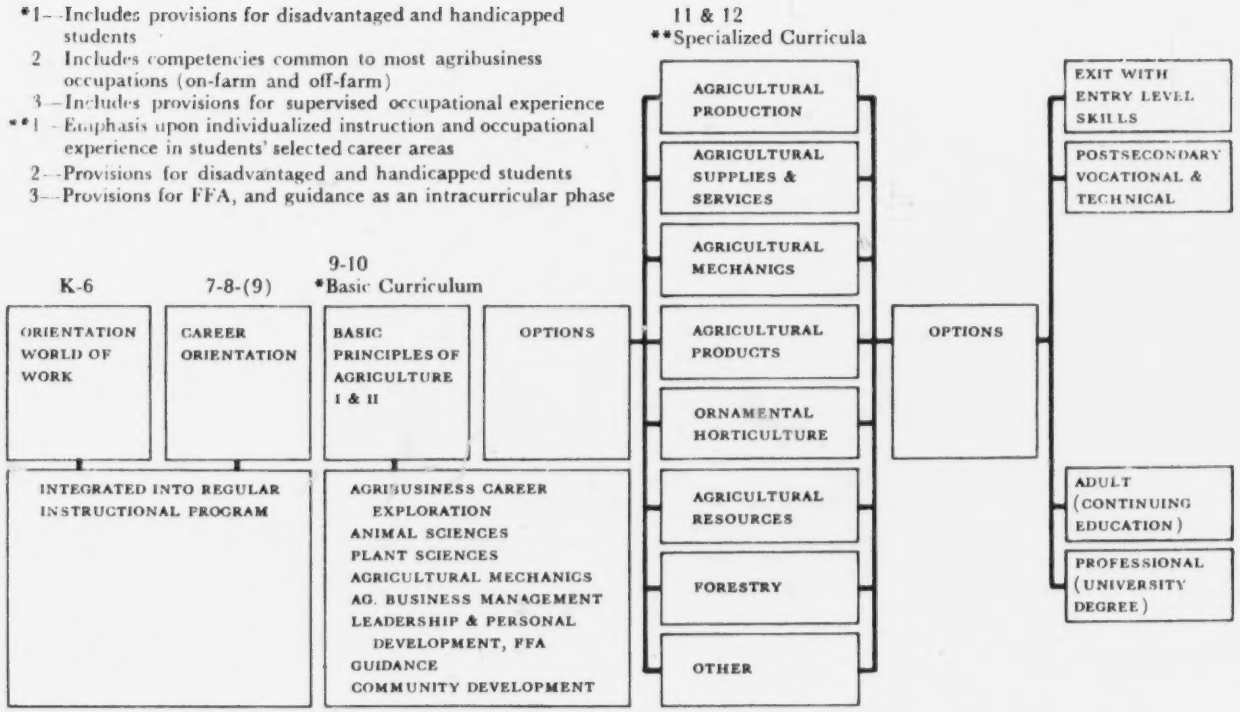

Fig. 2.--Education in Agribusiness and Natural Resources
(American Vocational Association, n.d.:11)

college, or university. Many high schools have instructional programs which prepare youth for entering certain of these occupations. The first year or two may involve a study of the basic principles of agriculture. This study is followed by one or two years of instruction in a specialized curriculum. Such instruction is designed to develop skills for entry level employment and to provide a foundation of basic knowledge for community college or university study. Most high school programs include occupational experience through part-time, on-the-job work activities under the supervision of the school. This experience is deemed necessary in order to make instruction practical and meaningful (Phipps, 1972).

Instruction in agribusiness and natural resources on the high school level is considered very beneficial for most occupations in the cluster. Community colleges provide training for specific technical or skilled occupations. The training is usually articulated with advanced college or university study. Colleges and universities offer various specialized curricula that lead to professional-level employment in many areas of agribusiness and natural resources.

After formal programs of preparation for agribusiness and natural resources work have been completed and an occupation has been entered, continuance of education is imperative. New developments in machinery, chemicals, and procedures require successful workers in agribusiness and natural resources to keep up-to-date. Programs to keep workers informed of current practices may be provided by high schools, vocational schools, community colleges, colleges, or universities. Many high schools have adult education programs in agribusiness and natural resources. Short courses offered by colleges and universities are common. Most communities have adult education programs sponsored by the Cooperative Extension Service. Numerous leaders and specialists in various areas of agribusiness and natural resources may be available on a local or regional basis to provide individual and group instruction. In addition to adult programs, the Cooperative Extension Service also conducts programs of interest to children and youth.

SUMMARY

Agribusiness occupations are primarily concerned with the production of food and fiber, including the supplies and services needed to make production possible and the processing and distribution of the products once they have been produced. Also included as agribusiness

are occupations in forestry and ornamental horticulture. These involve many of the same skills in plant, soil and animal science and agricultural mechanics as do the agribusiness occupations. The natural resources occupations that deal with the natural resources which are said to be renewable are included. Such occupations are concerned with soil and water management, wildlife, fish, rural recreation, and other areas.

Agribusiness and natural resources occupations are essential to the preservation of the standard of living now found in the United States. Without an efficient agricultural industry, other industries could not have flouished as they have. Many of the developments in agribusiness and natural resources are due to agricultural research and educational programs. The opportunities for employment will be good for the young men and women who are well-educated and possess the needed skills.

BIBLIOGRAPHY[1]

American Vocational Association. Transitions in Agricultural Education: Focusing on Agribusiness and Natural Resources Occupations. Report of a National Seminar (Denver, Colorado, May 11-14, 1971). Washington, DC: American Vocational Association; and the Division of Vocational-Technical Education, U.S. Office of Education, Department of Health, Education, and Welfare. n.d. 26 pp. Available from Publication Sales, American Vocational Association, 1510 H Street, Washington, DC. 20005 (Order Number 48172, $2.00). Preliminary draft available, see ED 063 490.

Commission on Education in Agriculture and Natural Resources. Agricultural Education for the Seventies and Beyond. Washington, DC: Committee on Agriculture Education; Commission on Education in Agriculture and Natural Resources; and American Vocational Association. July, 1971. 46 pp. VT 014 163, MF available in VT-ERIC Set ED 063 517.

Drawbaugh, Charles C., and Merritt, Richard H. New Jersey Manpower Needs in Natural Resources and/or Agriculture. New Brunswick, NJ: Rutgers, The State University. 1972. 205 pp. ED 069 862 MF $0.65 HC $9.87.

Eichelberger, A.E., et al. A Guide for Planning Programs in Agricultural Education. Mississippi State: Mississippi Curriculum Coordinating Unit, Mississippi State University. 1972.

Hoover, Norman K. Handbook of Agricultural Occupations: Preparation for Technical and Professional Work in Agriculture. Second edition. Danville, IL: The Interstate Printers and Publishers, Inc. 1969.

Lee, Jasper S. Occupational Orientation: An Introduction to the World of Work. State College: Mississippi Curriculum Coordinating Unit; and Jackson: Division of Vocational and Technical Education, Mississippi State Department of Education. 1971. 213 pp. ED 057 235 MF $0.65 HC $9.87.

---

[1]Bibliographical entries followed by an ED number are generally available in hard copy or microfiche through the Educational Resources Information Center (ERIC). This availability is indicated by the abbreviations MF for microfiche and HC for hard copy. Order from ERIC Document Reproduction Service (EDRS), P.O. Drawer O, Bethesda, Maryland 20014. Payment must accompany orders totaling less than $10.00. Documents available from the Government Printing Office may be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

McMinn, J.H. Career Education in Mississippi. Jackson: Division of Vocational Education, Mississippi State Department of Education. 1973.

Mississippi State University. Consultation with the Department of Agriculture, Mississippi State University. Mississippi State: Division of Agriculture, Mississippi State University. 1972.

Phipps, Lloyd J. Handbook on Agricultural Education in Public Schools. Third edition. Danville, IL: The Interstate Printers and Publishers, Inc. 1972.

Polopolus, Leo, and Johnson, Jack D. Exploring Agribusiness. D.A.E. Circular No. 284. Baton Rouge: Louisiana State University, Department of Agricultural Economics. 1961.

Roy, Ewell Paul. Exploring Agribusiness. Danville, IL: The Interstate Printers and Publishers, Inc. 1967.

Sidney, Howard, ed. Career Opportunities--Agricultural Forestry and Oceanographic Technicians. Career Opportunity Series. Chicago: J.G. Ferguson Publishing Company. 1969.

Smith, Gerard C., and Crowley, Michael F. Occupational Manpower and Training Needs; Information for Planning Training Programs for the 1970's. Bulletin 1701. Washington, DC: Bureau of Labor Statistics, U.S. Department of Labor. 1971. 87 pp. ED 056 185 MF $0.65 HC $3.29. Also available from the Government Printing Office, Stock No. 2901-0656, $0.75.

Snowden, Obed L. Core Curricula for Agriculture and Agribusiness on All Levels of Education. A Research Report. Mississippi State: Mississippi State University. 1972.

Stone, Archie A. Careers in Agribusiness and Industry. Danville, IL: The Interstate Printing and Publishers, Inc. 1965.

Thames, Charlie, et al. A Guide for Teaching Forestry. Mississippi State: Mississippi Curriculum Coordinating Unit, Mississippi State University. 1972.

Thompson, Orville E., and Thomas, R.L. Functions and Activities Performed by Workers in Agriculture. Davis: Department of Applied Behavioral Sciences, University of California. 1972.

_____, et al. The Determination of Proper Allocation of Functions and Responsibilities of Institutions Providing Education in Agriculture. A Research Report. Davis: Department of Applied Behavioral Sciences, University of California. August, 1971a. 156 pp. ED 057 241 MF $0.65 HC $6.58.

_____. Education in Agriculture in California (Occupational Needs and Future Demands). A Research Report. Davis: Department of Applied Behavioral Sciences, University of California. August, 1971b. 16 pp. VT 014 377, MF available in VT-ERIC Set ED 062 579.

U.S. Bureau of the Census. Statistical Abstract of the United States: 1972. 93rd Edition. Washington, DC: U.S. Bureau of the Census, Department of Commerce. 1972.

U.S. Department of Agriculture. Background on U.S. Agriculture. Leaflet No. 491. Washington, DC: Office of Information, U.S. Department of Agriculture.

_____. Handbook of Agricultural Charts. Agriculture Handbook No. 439. Washington, DC: U.S. Department of Agriculture. October, 1972. Available from the Government Printing Office, $0.65.

U.S. Department of Labor. Dictionary of Occupational Titles, 1965. Volume I, Definitions of Titles. Washington, DC: Bureau of Employment Security, U.S. Department of Labor. 1965. ED 013 963, document not available from EDRS. Available from the Government Printing Office, Catalog No. L7.2--OC1/965v.1, $5.00.

_____. Tomorrow's Manpower Needs. Volume IV: The National Industry-Occupational Matrix and Other Manpower Data. BLS Bulletin 1737. 1971 Revision. Washington, DC: Bureau of Labor Statistics, U.S. Department of Labor. 202 pp. ED 066 593 MF $0.65 HC $9.87. Also available from the Government Printing Office, Catalog No. L2.3:1737/v.4, $1.50.

_____. Occupational Outlook Handbook. 1972-73 Edition. BLS Bulletin 1700. Washington, DC: Bureau of Labor Statistics, U.S. Department of Labor. 1972. 885 pp. ED 063 469 MF $0.65 HC $29.61. Also available from the Government Printing Office, Catalog No. L23:1700, $6.25.

U.S. Office of Education. Career Education, DHEW Publication No. (OE)72-39. Washington, DC: U.S. Department of Health, Education, and Welfare. 1971. 10 pp.

_____. Vocational Education and Occupations. Washington, DC: Branch of Occupational Analysis, Manpower Administration, U.S. Department of Labor; and Division of Vocational and Technical Education, U.S. Office of Education, Department of Health, Education and Welfare. 1969. 296 pp. ED 033 243 MF $0.65 HC not available from EDRS. Available from the Government Printing Office, Catalog No. FS5.280:80061, $2.25.

Weyant, J. Thomas, et al. An Introduction to Agricultural Business and Industry. Danville, IL: The Interstate Printers and Publishers, Inc. 1965.

Williams, David L., et al. Curriculum Materials for Teaching Students the Competencies Needed for Employment in Nonfarm Agricultural Business. Final Report. Urbana: Division of Agricultural Education, University of Illinois. July, 1971. 120 pp. ED 056 190 MF $0.65 HC $6.58.

Wilson, Charles M., and Martin, Joe A. The Agribusiness Complex in the Memphis Trade Area. Bulletin 465. Knoxville: Agricultural Experiment Station, The University of Tennessee. 1969.

The mission of the ERIC CLEARINGHOUSE ON VOCATIONAL AND TECHNICAL EDUCATION is to acquire, process, and disseminate research and related information and instructional materials on vocational and technical education and related fields. It is linked to the Educational Resources Information Center (ERIC), the national information system for education.

PRODUCTS

The information in the ERIC system is made available to users through several information access products. Documents and journal articles are acquired, selected, abstracted, indexed, and prepared for announcement in these publications. The document's abstract can be read in the same ERIC publication in which it is indexed. The full text of announced documents is available from the original source or from the ERIC Document Reproduction Service (EDRS) in microfiche and hard copy form.

* ABSTRACTS OF INSTRUCTIONAL MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (AIM), a quarterly publication, provides indexes to and abstracts of a variety of instructional materials intended primarily for teacher or student use.

* ABSTRACTS OF RESEARCH MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM) is published quarterly and provides indexes to and abstracts of research and related materials.

* COMPUTER TAPES of AIM and ARM contain resumes of over 6,000 documents on vocational and technical education that have not appeared in RIE.

* RESEARCH IN EDUCATION (RIE) and CURRENT INDEX TO JOURNALS IN EDUCATION (CIJE) are monthly publications. Many of the documents announced in AIM and ARM are also listed in RIE, the Central ERIC publication. Journal articles reviewed by the Clearinghouse are announced in CIJE, the CCM Corporation publication.

CAREER EDUCATION

A new project, the Supportive Information for the Comprehensive Career Education Model (SI/CCEM), is using the ERIC document base to provide information for the development of the Comprehensive Career Education Model (CCEM). In addition to using ERIC, the project staff is helping to acquire additional materials for CCEM. Many of these are being announced in AIM, ARM, and RIE.

INFORMATION ANALYSIS

The Clearinghouse engages in extensive information analysis activities designed to review, analyze, synthesize, and interpret the literature on topics of critical importance to vocational and technical education. Review and synthesis papers have been prepared on many problems or processes of interest to the entire field. Current emphasis is upon interpretation of major concepts in the literature for specific audiences. Recent career education publications have been developed that clarify and synthesize for program developers and decision-makers the theoretical, philosophical, and historial bases for career education.

USER SERVICES

In order to provide information on ways of utilizing effectively the ERIC document base, the Clearinghouse provides the following user services:

1. Information on the location of ERIC microfiche collections;

2. Information on how to order ERIC access products (AIM, ARM, RIE, and CIJE);

3. Bibliographies on timely vocational-technical and related topics such as (1) career education, (2) vocational education leadership development, (3) vocational education for disadvantaged groups, (4) correctional institutions, (5) cooperative vocational education, (6) information system for vocational decisions, and (7) management systems in vocational education;

4. Brochures describing ERIC operations and products;

5. Directing users to sources of information required for solving specific problems; and

6. Referral of requests to agencies that can provide special services.

YOUR INPUTS

Your comments, suggestions, and questions are always welcomed at the Clearinghouse. In addition, any documents you feel are beneficial to educators may be sent to the Clearinghouse for possible selection and inclusion into AIM, ARM, or RIE.

ERIC Clearinghouse on Vocational and Technical Education
1960 Kenny Road
Columbus, Ohio 43210

VT 020 375

DESCRIPTORS - *Agribusiness; *Natural Resources; *Occupational Information; *Employment Opportunities; *Career Education; Occupational Clusters.

ABSTRACT - Intended for teachers, counselors, and administrators, this booklet is designed to provide a brief description of the agribusiness and natural resources occupations cluster. Agribusiness is a blending of agriculture and business and is composed of two groups of occupations known as farm and nonfarm. Agribusiness and natural resources are concerned with meeting the basic needs of man. Occupations in agribusiness and natural resources involve a wide range of subjects and skill requirements in such areas as biological science, economics, communications, business procedures, and transportation. Included in this booklet is a brief description of the opportunities and requirements of occupations belonging to these subgroups of the agribusiness and natural resources cluster: (1) agricultural production, (2) agricultural supplies and services, (3) agricultural mechanics, (4) agricultural products, (5) ornamental horticulture, (6) forestry, and (7) natural resources. In addition to the brief descriptions, a review of the changes occurring in agriculture, the importance of agribusiness and natural resources occupations, and employment trends are discussed. (SB)